NI TSM-101x Series User Manual

NI TSM-1012, TSM-1015, TSM-1017 Touch Screen Monitors

January 2015
374647B-01

NATIONAL INSTRUMENTS

Worldwide Technical Support and Product Information

ni.com

Worldwide Offices

Visit ni.com/niglobal to access the branch office websites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.

National Instruments Corporate Headquarters

11500 North Mopac Expressway Austin, Texas 78759-3504 USA Tel: 512 683 0100

For further support information, refer to the *NI Services* appendix. To comment on National Instruments documentation, refer to the National Instruments website at ni.com/info and enter the Info Code feedback.

© 2014–2015 National Instruments. All rights reserved.

Legal Information

Limited Warranty

This document is provided ‘as is’ and is subject to being changed, without notice, in future editions. For the latest version, refer to `ni.com/manuals`. NI reviews this document carefully for technical accuracy; however, NI MAKES NO EXPRESS OR IMPLIED WARRANTIES AS TO THE ACCURACY OF THE INFORMATION CONTAINED HEREIN AND SHALL NOT BE LIABLE FOR ANY ERRORS.

NI warrants that its hardware products will be free of defects in materials and workmanship that cause the product to fail to substantially conform to the applicable NI published specifications for one (1) year from the date of invoice.

For a period of ninety (90) days from the date of invoice, NI warrants that (i) its software products will perform substantially in accordance with the applicable documentation provided with the software and (ii) the software media will be free from defects in materials and workmanship.

If NI receives notice of a defect or non-conformance during the applicable warranty period, NI will, in its discretion: (i) repair or replace the affected product, or (ii) refund the fees paid for the affected product. Repaired or replaced Hardware will be warranted for the remainder of the original warranty period or ninety (90) days, whichever is longer. If NI elects to repair or replace the product, NI may use new or refurbished parts or products that are equivalent to new in performance and reliability and are at least functionally equivalent to the original part or product.

You must obtain an RMA number from NI before returning any product to NI. NI reserves the right to charge a fee for examining and testing Hardware not covered by the Limited Warranty.

This Limited Warranty does not apply if the defect of the product resulted from improper or inadequate maintenance, installation, repair, or calibration (performed by a party other than NI); unauthorized modification; improper environment; use of an improper hardware or software key; improper use or operation outside of the specification for the product; improper voltages; accident, abuse, or neglect; or a hazard such as lightning, flood, or other act of nature.

THE REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND THE CUSTOMER’S SOLE REMEDIES, AND SHALL APPLY EVEN IF SUCH REMEDIES FAIL OF THEIR ESSENTIAL PURPOSE.

EXCEPT AS EXPRESSLY SET FORTH HEREIN, PRODUCTS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND AND NI DISCLAIMS ALL WARRANTIES, EXPRESSED OR IMPLIED, WITH RESPECT TO THE PRODUCTS, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE OR NON-INFRINGEMENT, AND ANY WARRANTIES THAT MAY ARISE FROM USAGE OF TRADE OR COURSE OF DEALING. NI DOES NOT WARRANT, GUARANTEE, OR MAKE ANY REPRESENTATIONS REGARDING THE USE OF OR THE RESULTS OF THE USE OF THE PRODUCTS IN TERMS OF CORRECTNESS, ACCURACY, RELIABILITY, OR OTHERWISE. NI DOES NOT WARRANT THAT THE OPERATION OF THE PRODUCTS WILL BE UNINTERRUPTED OR ERROR FREE.

In the event that you and NI have a separate signed written agreement with warranty terms covering the products, then the warranty terms in the separate agreement shall control.

Copyright

Under the copyright laws, this publication may not be reproduced or transmitted in any form, electronic or mechanical, including photocopying, recording, storing in an information retrieval system, or translating, in whole or in part, without the prior written consent of National Instruments Corporation.

National Instruments respects the intellectual property of others, and we ask our users to do the same. NI software is protected by copyright and other intellectual property laws. Where NI software may be used to reproduce software or other materials belonging to others, you may use NI software only to reproduce materials that you may reproduce in accordance with the terms of any applicable license or other legal restriction.

End-User License Agreements and Third-Party Legal Notices

You can find end-user license agreements (EULAs) and third-party legal notices in the following locations:

- Notices are located in the `<National Instruments>\_Legal Information` and `<National Instruments>` directories.
- EULAs are located in the `<National Instruments>\Shared\MDF\Legal\license` directory.
- Review `<National Instruments>\_Legal Information.txt` for information on including legal information in installers built with NI products.

U.S. Government Restricted Rights

If you are an agency, department, or other entity of the United States Government (“Government”), the use, duplication, reproduction, release, modification, disclosure or transfer of the technical data included in this manual is governed by the Restricted Rights provisions under Federal Acquisition Regulation 52.227-14 for civilian agencies and Defense Federal Acquisition Regulation Supplement Section 252.227-7014 and 252.227-7015 for military agencies.

Trademarks

Refer to the *NI Trademarks and Logo Guidelines* at `ni.com/trademarks` for more information on National Instruments trademarks.

ARM, Keil, and µVision are trademarks or registered of ARM Ltd or its subsidiaries.

LEGO, the LEGO logo, WEDO, and MINDSTORMS are trademarks of the LEGO Group.

TETRIX by Pitsco is a trademark of Pitsco, Inc.

FIELDBUS FOUNDATION™ and FOUNDATION™ are trademarks of the Fieldbus Foundation.

EtherCAT® is a registered trademark of and licensed by Beckhoff Automation GmbH.

CANopen® is a registered Community Trademark of CAN in Automation e.V.

DeviceNet™ and EtherNet/IP™ are trademarks of ODVA.

Go!, SensorDAQ, and Vernier are registered trademarks of Vernier Software & Technology. Vernier Software & Technology and vernier.com are trademarks or trade dress.

Xilinx is the registered trademark of Xilinx, Inc.

Taptite and Trilobular are registered trademarks of Research Engineering & Manufacturing Inc.

FireWire® is the registered trademark of Apple Inc.

Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries.

Handle Graphics®, MATLAB®, Real-Time Workshop®, Simulink®, Stateflow®, and xPC TargetBox® are registered trademarks, and TargetBox™ and Target Language Compiler™ are trademarks of The MathWorks, Inc.

Tektronix®, Tek, and Tektronix, Enabling Technology are registered trademarks of Tektronix, Inc.

The Bluetooth® word mark is a registered trademark owned by the Bluetooth SIG, Inc.

The ExpressCard™ word mark and logos are owned by PCMCIA and any use of such marks by National Instruments is under license.

The mark LabWindows is used under a license from Microsoft Corporation. Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

Other product and company names mentioned herein are trademarks or trade names of their respective companies.

Members of the National Instruments Alliance Partner Program are business entities independent from National Instruments and have no agency, partnership, or joint-venture relationship with National Instruments.

Patents

For patents covering National Instruments products/technology, refer to the appropriate location: **Help»Patents** in your software, the patents.txt file on your media, or the *National Instruments Patent Notice* at ni.com/patents.

Export Compliance Information

Refer to the *Export Compliance Information* at ni.com/legal/export-compliance for the National Instruments global trade compliance policy and how to obtain relevant HTS codes, ECCNs, and other import/export data.

WARNING REGARDING USE OF NATIONAL INSTRUMENTS PRODUCTS

YOU ARE ULTIMATELY RESPONSIBLE FOR VERIFYING AND VALIDATING THE SUITABILITY AND RELIABILITY OF THE PRODUCTS WHENEVER THE PRODUCTS ARE INCORPORATED IN YOUR SYSTEM OR APPLICATION, INCLUDING THE APPROPRIATE DESIGN, PROCESS, AND SAFETY LEVEL OF SUCH SYSTEM OR APPLICATION.

PRODUCTS ARE NOT DESIGNED, MANUFACTURED, OR TESTED FOR USE IN LIFE OR SAFETY CRITICAL SYSTEMS, HAZARDOUS ENVIRONMENTS OR ANY OTHER ENVIRONMENTS REQUIRING FAIL-SAFE PERFORMANCE, INCLUDING IN THE OPERATION OF NUCLEAR FACILITIES; AIRCRAFT NAVIGATION; AIR TRAFFIC CONTROL SYSTEMS; LIFE SAVING OR LIFE SUSTAINING SYSTEMS OR SUCH OTHER MEDICAL DEVICES; OR ANY OTHER APPLICATION IN WHICH THE FAILURE OF THE PRODUCT OR SERVICE COULD LEAD TO DEATH, PERSONAL INJURY, SEVERE PROPERTY DAMAGE OR ENVIRONMENTAL HARM (COLLECTIVELY, “HIGH-RISK USES”). FURTHER, PRUDENT STEPS MUST BE TAKEN TO PROTECT AGAINST FAILURES, INCLUDING PROVIDING BACK-UP AND SHUT-DOWN MECHANISMS. NI EXPRESSLY DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY OF FITNESS OF THE PRODUCTS OR SERVICES FOR HIGH-RISK USES.

Compliance

Electromagnetic Compatibility Information

This product was tested and complies with the regulatory requirements and limits for electromagnetic compatibility (EMC) stated in the product specifications. These requirements and limits provide reasonable protection against harmful interference when the product is operated in the intended operationalelectromagnetic environment.

This product is intended for use in industrial locations. However, harmful interference may occur in some installations, when the product is connected to a peripheral device or test object, or if the product is used in residential or commercial areas. To minimize interference with radio and television reception and prevent unacceptable performance degradation, install and use this product in strict accordance with the instructions in the product documentation.

Furthermore, any modifications to the product not expressly approved by National Instruments could void your authority to operate it under your local regulatory rules.

Caution To ensure the specified EMC performance, operate this product only with shielded cables and accessories. Do not use unshielded cables or accessories unless they are installed in a shielded enclosure with properly designed and shielded input/output ports and connected to the product using a shielded cable. If unshielded cables or accessories are not properly installed and shielded, the EMC specifications for the product are no longer guaranteed.

Caution To ensure the specified EMC performance, the length of all power wiring and I/O cables must be no longer than 3 m (10 ft).

Contents

About This Manual

Conventions ix

Chapter 1
NI TSM-101x Overview

About This Monitor 1-1
Hardware Overview 1-1
    Connectors 1-1

Chapter 2
Installing Software Drivers

About NI TSM-101x Software Drivers 2-1
Supported Operating Systems 2-1
Selecting Touch Screen Modality 2-1
    Selecting Touch Screen Modality on Windows 2-1
        Installing the Touch Panel Driver on Windows 2-2
        Changing Touch Screen Modality on Windows 2-2
        Calibrating the Touch Screen on Windows 2-2
    Enabling the Embedded UI on NI Linux Real-Time 2-3
        Installing the Touch Panel Driver on NI Linux Real-Time 2-3
        Calibrating the Touch Screen on NI Linux Real-Time 2-3

Chapter 3
Installing the Monitor

Packing List 3-1
    Optional Accessories 3-1
Installation Precautions 3-2
Connecting Power to the Monitor 3-2
    Wiring the Terminal Block 3-2
    Connecting an Adapter to the Power Jack 3-3
Mounting the Monitor 3-3
    Panel Mounting 3-3
    Cabinet or Rack Mounting 3-4
    Mounting to a Monitor Stand 3-5
    Mounting to a Monitor Arm 3-6
    Mounting with the V-Mount Kit 3-6

Appendix A
Specifications

Appendix B
Connectors and Controls

Appendix C
Safety Precautions

Appendix D
NI Services

About This Manual

Conventions

This icon denotes a caution, which advises you of precautions to take to avoid injury, data loss, or a system crash.

When this symbol is marked on a product, it denotes a warning advising you to take precautions to avoid electrical shock.

When this symbol is marked on a product, it denotes a component that may be hot. Touching this component may result in bodily injury.

1

NI TSM-101x Overview

This chapter provides an overview of the features and components of the NI TSM-101x touch screen monitor.

Caution Do *not* operate the monitor in a manner not specified in this document. Product misuse can result in a hazard. You can compromise the safety protection built into the product if the product is damaged in any way. If the product is damaged, return it to National Instruments for repair.

About This Monitor

The NI TSM-101x series is a resistive touch screen, color LCD flat panel monitor for industrial applications.

There are three models in the NI TSM-101x series: the NI TSM-1012, NI TSM-1015, and the NI TSM 1017. These models differ in dimensions and weight, as described in the *Physical Characteristics* section of Appendix A, *Specifications*, of this document.

Hardware Overview

The front of the TSM-101x monitor is a flat panel LCD screen surrounded by an aluminum frame. A small keypad on the rear of the monitor controls the onscreen display (OSD).

Connectors

The NI TSM-101x monitor includes the following connectors.

- **USB**—Enables touch screen modality from the monitor to the host machine. The monitor supports touch screen modality through USB 2.0 or RS-232.
- **RS-232**—Enables touch screen modality from the monitor to the host machine. This is an optional connector for legacy equipment. The monitor supports touch screen modality through RS-232 or USB 2.0.
- **9 to 36 V terminal block**—A screw terminal power input that accepts 9 to 36 V.
- **9 to 36 V lockable DC jack**—Connects to the optional 9 to 36 V DC power adapter.
- **VGA**—Connects VGA video output from the host machine into the monitor.
- **DVI-D**—Connects Digital Visual Interface Display Input from the host machine into the monitor.
- **DisplayPort**—Connects the monitor to compatible DisplayPort devices.

2

Installing Software Drivers

This chapter describes how to install the software drivers for the NI TSM-101x monitor.

About NI TSM-101x Software Drivers

The touch panel driver enables the NI TSM-101x monitor to communicate directly with the host machine. The driver emulates configurable left and right mouse button functions via the touch panel interface.

Supported Operating Systems

The touch panel driver supports the following operating systems:

- Microsoft Windows
  - Microsoft Windows 2000
  - Microsoft Windows XP
  - Microsoft Windows 2003
  - Microsoft Windows 2008
  - Microsoft Windows Vista
  - Microsoft Windows 7
  - Microsoft Windows 8
- NI Linux Real-Time

Selecting Touch Screen Modality

Selecting Touch Screen Modality on Windows

The NI TSM-101x monitor supports touch screen modality through an RS-232 or a USB connection. Connect either the RS-232 or the USB to the appropriate connector on the host machine before installing the driver.

Note The default touch screen interface is USB. The RS-232 is optional for resistive touch ATO.

Installing the Touch Panel Driver on Windows

Take the following steps to install the touch panel driver after the NI TSM-101x monitor is connected to a computer.

1. Insert the driver CD and select the **Touch Screen** option in the driver CD menu.
2. Double-click **Setup** to make the welcome screen appear.
3. Click **Next.**
4. Click **I Agree** to accept the license agreement.
5. The Choose Install Location screen appears. Browse to a **Destination Folder** and click **Install**.
6. When the installation is complete, click **Finish**.

Changing Touch Screen Modality on Windows

Take the following steps to change the touch screen modality from USB to RS-232 or vice versa.

1. Uninstall the touch screen driver.
2. Remove the USB or RS-232 cable.
3. Connect the monitor with the new cable.
4. Reinstall the driver CD.

Calibrating the Touch Screen on Windows

Take the following steps to calibrate the motion of the touch screen cursor with a touch screen pen or finger.

1. Ensure the monitor is properly connected through an RS-232 or USB cable.
2. Ensure the touch screen driver is properly installed.
3. Click the PenMount icon in the bottom left corner of the screen, as shown Figure 2-1, and select **Control Panel**.

Figure 2-1. The PenMount Icon

4. The Control Panel dialog box appears. Double-click the **PenMount 6000** icon on the **Device** tab.
5. The calibration screen appears. Select the **Standard Calibration** button.
6. Follow the onscreen instructions. Touch the screen at the five specified points to calibrate.

Enabling the Embedded UI on NI Linux Real-Time

The NI TSM-101x monitor requires a USB connection for touch-screen modality on NI Linux Real-Time targets.

Note NI Linux Real-Time does not support RS-232 touch screen modality.

Use a USB cable to connect the monitor to the target and complete the following steps to enable touch screen modality.

Installing the Touch Panel Driver on NI Linux Real-Time

1. Install the recommended software set on the target.
   a. In MAX, expand **Remote Systems** in the configuration tree, then expand the RT target by clicking the arrow beside it.
   b. Select **Software**.
   c. Click **Add/Remove Software** at the top of the Software tab to launch the LabVIEW Real-Time Software Wizard.
   d. Select a recommended software set to install. Click **Next**. MAX displays installation progress, and restarts the target.
2. Select the **Enable Embedded UI** checkbox in MAX.
   a. Expand **Remote Systems** in the configuration tree, then select the RT target.
   b. Place a check in the **Enable Embedded UI** checkbox.
   c. Click **Save**, then select **Yes** when prompted to restart the target.

Calibrating the Touch Screen on NI Linux Real-Time

The touch screen may be out of calibration on first use. Visit `ni.com/info` and enter the Info Code `CalibrateTouchScreenLinuxRT` for information about calibrating the NI TSM-101x touch screen on an RT target.

3 Installing the Monitor

This chapter provides step-by-step instructions and safety precautions for unpacking, installing, and mounting the monitor. Installation requires a Phillips screwdriver and may require additional accessories listed in Table 3-1.

Packing List

The following components are shipped with the NI TSM-101x monitor:

Caution Do not remove the plastic cover over the LCD screen until the NI TSM-101x is properly installed.

- ☐ Touch Screen Stylus
- ☐ CD with Windows drivers and user manual
- ☐ USB A-to-A Cable
- ☐ RS-232 Cable

If any of the items on the packing list are missing or damaged, contact National Instruments immediately. Refer to the *Services and Resources* section for contact information.

Optional Accessories

Table 3-1. Optional accessories for the NI TSM-101x monitor.

Accessory	NI TSM-1012	NI TSM-1015	NI TSM-1017
Arm	783674-01		
Stand	783672-01	783763-01	
V-Mount Kit	783675-01	N/A	
Panel Mount Kit	783668-01		
Rack Mount Kit	783669-01	783670-01	783671-01

Installation Precautions

The NI TSM-101x monitor may require at least two people to mount due to its weight.

Disconnect all power to the monitor during installation.

Position the power cord so that it cannot be stepped on. Do not place anything over the power cord.

Ensure the monitor is located near an easily accessible power outlet.

Only qualified personnel should install and operate the monitor.

Leave at least 50 mm (0.04 in.) of clearance around the monitor to prevent overheating.

Do *not* overload the voltage feeds. Provide external overcharge protection as per the label on the back of the monitor.

Connecting Power to the Monitor

Caution You must use a UL Listed ITE power supply marked *LPS* with the NI TSM-101x.

Wiring the Terminal Block

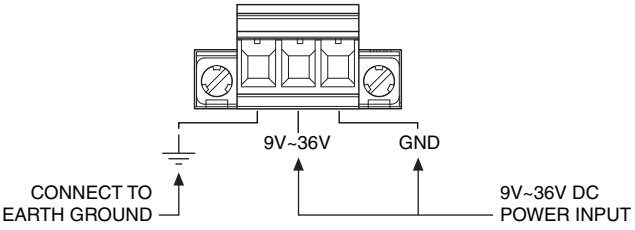
Connect the leads of the 9 to 36 V DC power supply into the terminal block.

Caution To ensure the specified EMC performance, the length of all power wiring must not exceed 3 m (10 ft).

Use wire that meets the specifications in the *Physical Characteristics* section. Attach the power and ground wires to the correct sockets of the connector as shown in Figure 3-1.

Connect earth ground to the grounding electrode system of your facility using a method appropriate for the application.

Figure 3-1. Wiring the Three-Pin Power Connector



Connecting an Adapter to the Power Jack

Alternatively, the monitor can be powered through the lockable 9-36 V DC jack. You must use an adapter with a locking connector that meets the specifications in the *Physical Characteristics* section.

Mounting the Monitor

The NI TSM-101x monitor can be mounted in a panel, cabinet, rack, wall, or on a monitor arm or stand.

Caution When mounting, do not overtighten the retention screws.

Panel Mounting

The NI TSM-101x monitor has a series of mounting slots on the top and bottom panel, and requires nine mounting clamps to mount to a panel.

Take the following steps to mount the NI TSM-101x to a panel:

1. Cut out a section of the panel that corresponds to the dimensions of the rear panel of the monitor as shown in Table 3-2.

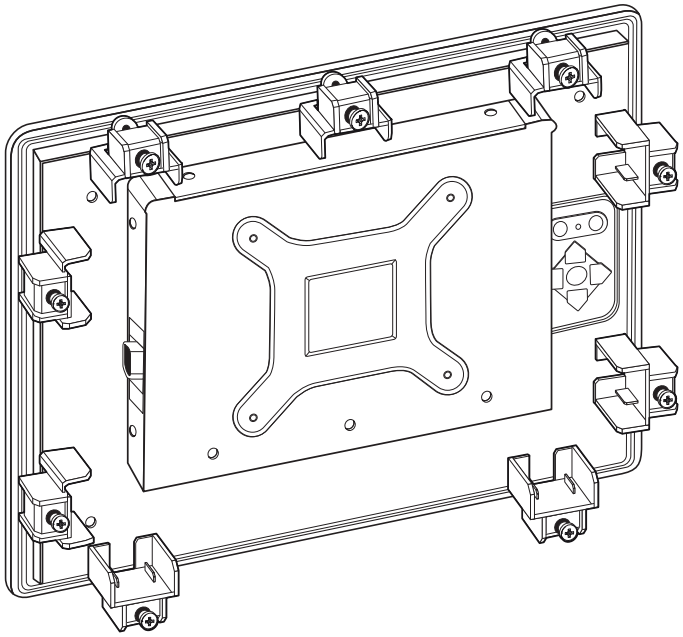
Table 3-2. Suggested Cutout Dimensions

Model	Height	Width
NI TSM-1012	243.8 mm (9.6 in.)	303.8 mm (11.96 in.)
NI TSM-1015	284.6 mm (11.2 in.)	360.1 mm (14.18 in.)
NI TSM-1017	340 mm (13.36 in.)	532 mm (20.94 in.)

2. Slide the monitor through the cutout until the aluminum frame is flush against the panel.

3. Secure the panel mounting brackets to the rear of the monitor. Insert the panel mounting clamps into the holes along the two edges of the panel mounting brackets. Figure 3-2 shows the panel mounting clamp positions.

Figure 3-2. Panel Mounting Clamp Positions



4. Use a Phillips screwdriver to tighten the screws that pass through the panel mounting clamps until the plastic caps at the front of the screws are firmly secured to the panel.

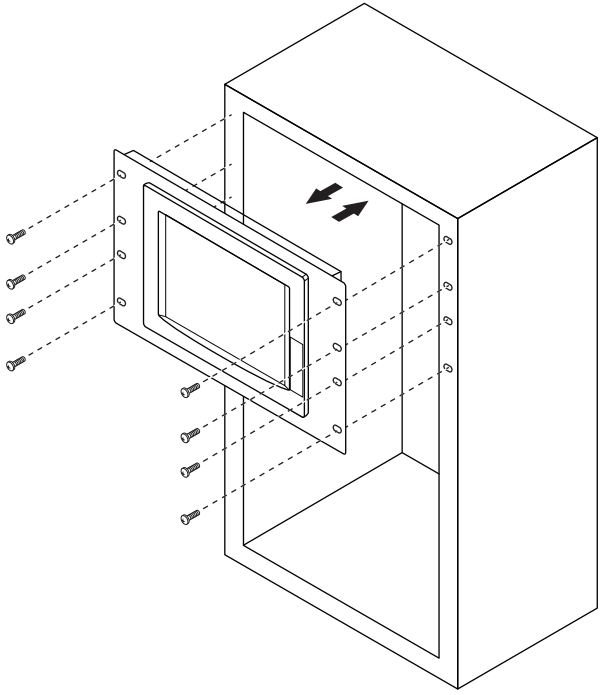
Cabinet or Rack Mounting

The back of the metal frame around the monitor has retention screw holes for a cabinet or rack installation bracket. Take the following steps to mount the NI TSM-101x monitor into a cabinet or rack.

1. Slide the monitor through the cabinet or rack bracket until the rear side of the monitor frame is flush against the front of the bracket.
2. Secure the panel mounting bracket to the rear of the monitor. Insert the panel mounting clamps into the holes along the edges of the monitor, as shown in Figure 3-2.
3. Use a Phillips screwdriver to tighten the screws that pass through the panel mounting clamps. Secure the plastic caps at the front of the screws to the panel.
4. Slide the monitor with the attached bracket into a rack or cabinet.

5. Insert and tighten the retention screws to secure the system into a cabinet or rack as shown in Figure 3-3.

Figure 3-3. Securing the Cabinet or Rack Bracket



Mounting to a Monitor Stand

The NI TSM-101x monitor has standard Video Electronics Standards Association (VESA) mounting holes in the rear panel. The holes are designed for M4 screws and set at 100 mm × 100 mm (3.94 in. × 3.94 in.) apart.

The monitor stand mounting plate has a matching VESA hole pattern. Take the following steps to mount the NI TSM-101x monitor onto a stand.

1. Align the threaded holes on the monitor rear panel with the screw holes on the monitor stand mounting plate.
2. Secure the monitor to the stand with the supplied retention screws.

Mounting to a Monitor Arm

The NI TSM-101x monitor has standard Video Electronics Standards Association (VESA) mounting holes in the rear panel. The holes are designed for M4 screws and set at 100 mm × 100 mm (3.94 in. × 3.94 in.) apart.

The monitor arm mounting plate has a matching VESA hole pattern. Take the following steps to mount the monitor to a monitor arm:

1. Align the threaded holes on the monitor rear panel with the screw holes on the monitor arm mounting plate.
2. Secure the monitor to the arm with the supplied retention screws.

Mounting with the V-Mount Kit

You can use the V-Mount Kit to mount the NI TSM-1012 to a wall, ceiling, desk, or other surface. The V-Mount has a 0 to 90 degree adjustable hinge to optimize the viewing angle of the monitor.

Note The V-Mount is compatible only with the NI TSM-1012.

Take the following steps to mount the NI TSM-1012 with the V-Mount Kit.

1. Mark the locations of the four V-Mount retention screw holes on the mounting surface.
2. Align the VESA mounting holes in the V-Mount with the mounting holes in the rear of the monitor.
3. Insert retention screws through the VESA mounting holes to secure the V-Mount to the monitor.

Note The VESA holes on the monitor are designed for M4 screws and set at 100 mm × 100 mm (3.94 in. × 3.94 in.) apart.

4. Secure the V-Mount and monitor to the surface with retention screws in the locations you marked in step 1.

A

Specifications

This chapter provides the specifications for the display panel. Specifications are subject to change without notice. For the most recent display panel specifications, visit `ni.com/manuals`.

Physical Characteristics

NI TSM-101x

Construction ..... Aluminum front cover, sheet metal rear cover

Mounting ..... Panel, V-Mount (NI TSM-1012 only), rack mount, monitor arm, or monitor stand

Screw-terminal wiring gauge ..... 0.2 mm^2 to 2.1 mm^2 (20 to 14 AWG) copper conductor wire with 10 mm (0.39 in.) of insulation stripped from the end

Locking adapter connector size

- Inner diameter ..... 2.5 mm (0.10 in.)
- Outer diameter ..... 5.5 mm (0.22 in.)

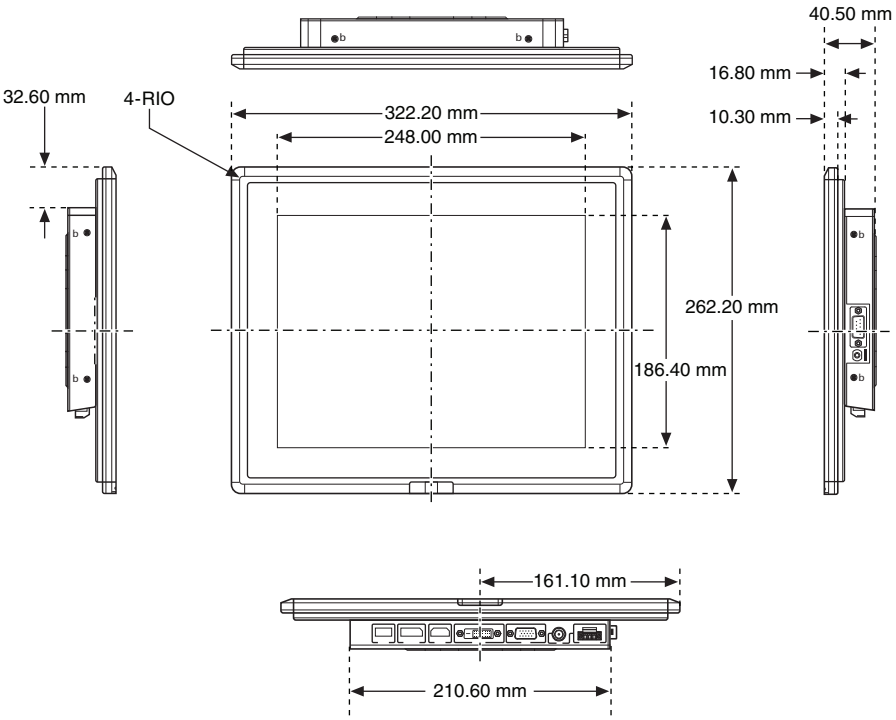
NI TSM-1012

Dimensions .....262.2 mm × 322.2 mm × 40.5 mm
(10.3 in. × 12.7 in. × 1.6 in.)

Cutout Dimensions .....234.8 mm × 303.8 mm
(9.2 in. × 12 in.)

Weight (Net, Gross) .....2.7 kg, 4.9 kg
(5.95 lb, 10.8 lb)

Figure A-1. NI TSM-1012 Dimensions



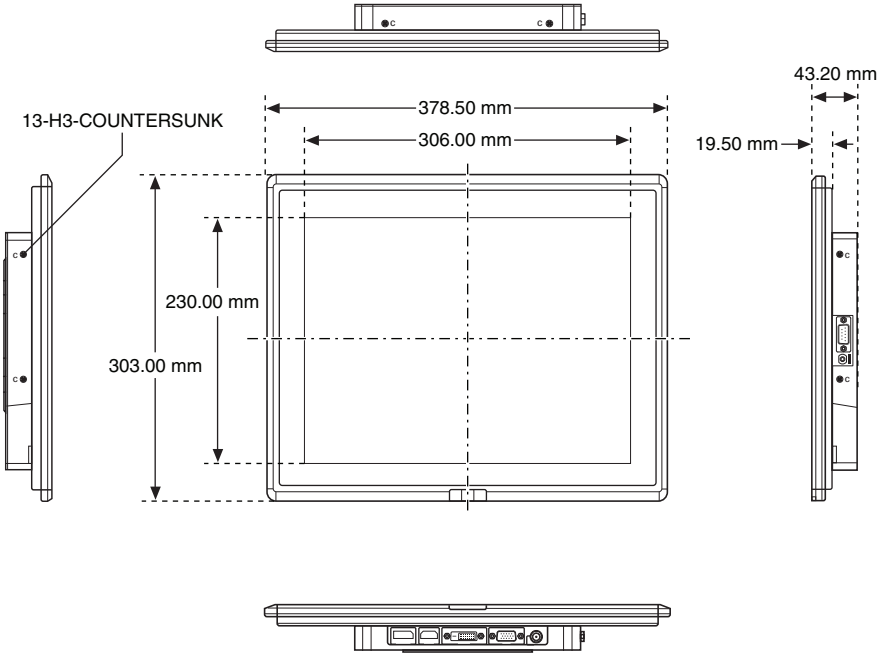
NI TSM-1015

Dimensions ..... 303 mm × 378.5 mm × 43.2 mm
(11.9 in. × 14.9 in. × 1.7 in.)

Cutout Dimensions ..... 284.6 mm × 360.1 mm
(11.2 in. × 14.18 in.)

Weight (Net, Gross) ..... 3.5 kg, 5.5 kg
(7.7 lb, 12.1 lb)

Figure A-2. NI TSM-1015 Dimensions



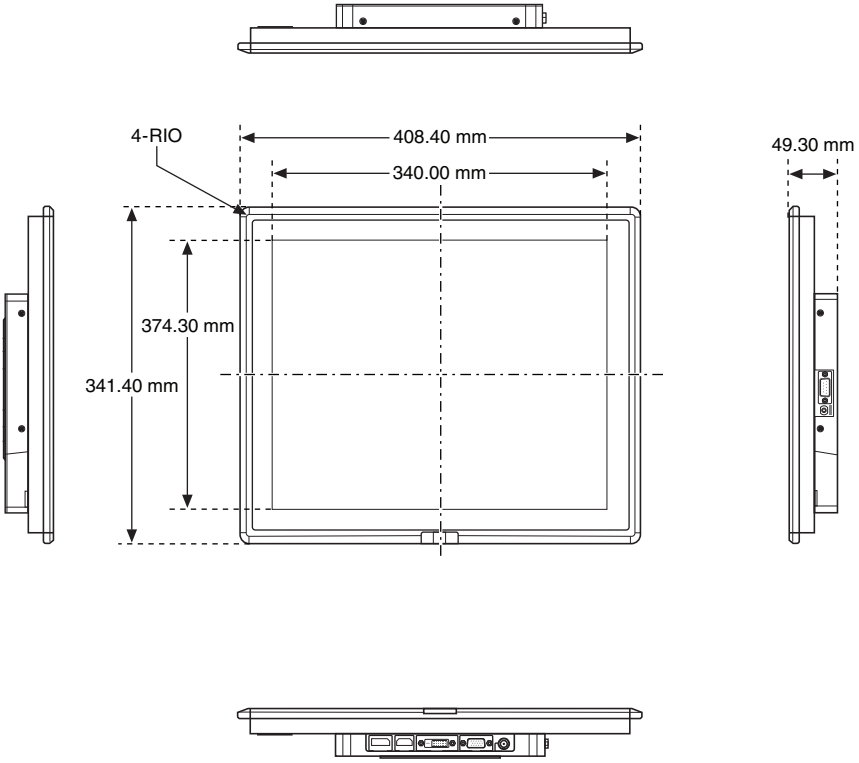
NI TSM-1017

Dimensions ..... 341.4 mm × 408.4 mm × 49.3 mm
(13.4 in. × 16 in. × 1.9 in.)

Cutout Dimensions ..... 323 mm × 398 mm
(12.7 in. × 15.7 in.)

Weight (Net, Gross) ..... 4.4 kg, 7.1 kg
(9.7 lb, 15.6 lb)

Figure A-3. NI TSM-1017 Dimensions



LCD Characteristics

NI TSM-1012

LCD Display ..... 305 mm (12 in.) (4:3)
Maximum Resolution ..... 1024 × 768
Brightness (cd/m^2) 600
Contrast Ratio 700:1
LCD Color ..... 16.2 M
Pixel Pitch ..... 0.24 mm × 0.24 mm
Viewing Angle (H-V) ..... 160°/140°
Backlight MTBF ..... 50,000 hours

NI TSM-1015

LCD Display ..... 381 mm (15 in.) (4:3)
Maximum Resolution ..... 1024 × 768
Brightness (cd/m^2) 400
Contrast Ratio 700:1
LCD Color ..... 16.2 M
Pixel Pitch ..... 0.29 mm × 0.29 mm
Viewing Angle (H-V) ..... 160°/140°
Backlight MTBF ..... 50,000 hours

NI TSM-1017

LCD Display ..... 432 mm (17 in.) (5:4)
Maximum Resolution ..... 1280 × 1024
Brightness (cd/m^2) 350
Contrast Ratio 1000:1
LCD Color ..... 16.7 M
Pixel Pitch ..... 0.26 mm × 0.26 mm
Viewing Angle (H-V) ..... 170°/160°
Backlight MTBF ..... 50,000 hours

I/O Ports

VGA (DB-15) 1
DVI-D 1
DisplayPort 1.1 1
USB 2.0 for touchscreen 1
RS-232 for touchscreen 1
Lockable 9 to 36 V DC jack 1
9 to 36 V terminal block 1

Environmental

Ambient temperature range ..... -20 °C to 60 °C
Storage temperature range ..... -20 °C to 70 °C
Operating relative humidity ..... 10% to 95%, noncondensing
Pollution Degree 2
Maximum altitude ..... 2,000 m
Indoor use only.

Power Requirements

Caution You must use a UL Listed ITE power supply marked *LPS* with the NI TSM-101x.

Power input range ..... 9 to 36 V DC

Certifications

- RoHS—All NI TSM-101x models comply with the Restriction of Hazardous materials (RoHS) Directive.
- IP 65—The front panels on all NI TSM-101x models have an ingress protection rating of 65 (IP 65). The front panels are protected from dust particles and water spray.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 55022 (CISPR 22): Class A emissions
- EN 55024 (CISPR 24): Immunity
- AS/NZS CISPR 22: Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-003: Class A emissions

Note For EMC declarations and certifications, and additional information, refer to the Online Product Certification section.

Safety

This product is designed to meet the requirements of the following standards of safety for information technology equipment:

- EC 60950-1, EN 60950-1

CE Compliance CE

All NI TSM-101x models meet the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

To obtain product certifications and the DoC for this product, visit `ni.com/certification`, search by model number or product line, and click the appropriate link in the Certification column.

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *Minimize Our Environmental Impact* web page at `ni.com/environment`. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers At the end of the product life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers, National Instruments WEEE initiatives, and compliance with WEEE Directive 2002/96/EC on Waste and Electronic Equipment, visit `ni.com/environment/weee`.

电子信息产品污染控制管理办法 （中国 RoHS）

中国客户 National Instruments 符合中国电子信息产品中限制使用某些有害物质指令 (RoHS)。关于 National Instruments 中国 RoHS 合规性信息，请登录 `ni.com/environment/rohs_china`。(For information about China RoHS compliance, go to `ni.com/environment/rohs_china`.)

B

Connectors and Controls

Connectors

DisplayPort Connector

The DisplayPort connector transmits a digital signal to compatible DisplayPort devices. The pins on the connector have the standard pin numbering configuration for a DisplayPort connector.

Table B-1. DisplayPort Connector Pinouts

Pin	Description
1	ML_L3N
2	GND
3	ML_L3P
4	ML_L2N
5	GND
6	ML_L2P
7	ML_L1N
8	GND
9	ML_L1P
10	ML_L0N
11	GND
12	ML_L0P
13	GND
14	GND
15	C_DDI0_DP_AUXP
16	GND
17	C_DDI0_DP_AUXN

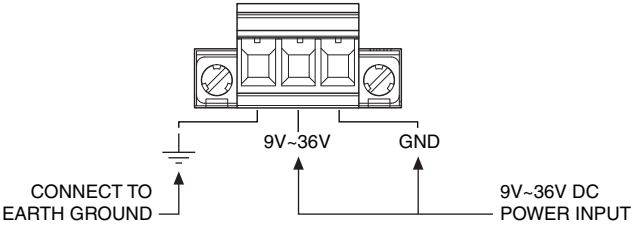
Table B-1. DisplayPort Connector Pinouts (Continued)

Pin	Description
18	C_DDI0_DP_HPD
19	GND
20	VCC
21	GND
22	GND
23	GND
24	GND

9 to 36 V Terminal Block

The 9 to 36 V DC terminal block has an earth ground socket, a ground socket, and three terminals for 9 to 36 V inputs.

Figure B-1. 3-Pin Terminal Block



DVI-D Connector

The DVI connector connects to a display device with DVI interface. The pins on the connector have the standard pin numbering configuration for a DVI-D connector.

Table B-2. DVI-D Connector Pinouts

Pin	Description
1	RX2-
2	RX2+
3	GND
4	NC
5	NC

Table B-2. DVI-D Connector Pinouts (Continued)

Pin	Description
6	DVI-SCL
7	DVI-SDA
8	NC
9	RX1-
10	RX1+
11	GND
12	NC
13	NC
14	DVI-5V
15	GND
16	HOT-PLUG
17	RX0-
18	RXO+
19	GND
20	NC
21	NC
22	GND
23	RXC-
24	RXC-

VGA Connector

The VGA connector connects VGA video output from the host machine into the monitor. The pins on the connector have the standard pin numbering configuration for a VGA connector.

Table B-3. VGA Connector Pinouts

Pin	Description
1	RED
2	GREEN
3	BLUE
4	NC
5	GROUND
6	GROUND
7	GROUND
8	GROUND
9	NC
10	GROUND
11	NC
12	DDCDAT
13	HSYNC
14	VSYNC
15	DDCCLK

USB for Touch Panel Connector

The USB touch panel connector enables touch screen modality from the monitor to the host machine. The pins on the connector have the standard pin numbering configuration for a USB-A connector.

Table B-4. USB Connector Pinouts

Pin	Description
1	VCC
2	USB20_N11
3	USB20_P11
4	GND

Display Panel Keypad

The NI-TSM 101x monitor has a small keypad on the rear panel. Use this keypad to navigate the onscreen menus, turn the screen on and off, and auto-adjust the image and display settings.

Image Menu

The following image menu options are listed in the order they appear onscreen. Grayed out options do not appear in the list.

- **Brightness**—Adjusts the brightness of the screen. The brightness control is disabled when the auto-dimming function is on.
- **Contrast**—Adjusts the contrast of the screen. Adjusting this value too high or too low worsens the image quality.
- **Sharpness**—Softens the edges around objects on the screen.
- **Color**—Provides the following options for color settings:
  - **Auto**—Automatically adjusts the color settings
  - **Color Temp**—Adjusts the following settings:
    - **5000k**—National Television System Committee (NTSC) standard Kelvin
    - **6500k**—NTSC standard Kelvin
    - **9300k**—NTSC standard Kelvin
    - **User**—Adjusts the balance between red, green, and blue color hues.

Display Menu

The following display menu options are listed in the order they appear onscreen.

- **Auto Adjust**—Automatically adjusts the LCD screen position.
- **Phase**—Adjusts the input signal (analog only).
- **Clock**—Adjusts the dot clock position.
- **Display Position**—Adjusts the Gamma.

System Menu

The following system menu options are listed in the order they appear onscreen.

- **Input**—Selects which input device to use.
- **OSD Settings**—Provides the following options for onscreen display (OSD) configuration:
  - **Timer**—Specifies how many seconds the screen stays on after it is unattended.
  - **Rotation**—Adjusts the angle at which the image is rotated on the screen.
  - **Position**—Adjusts the image position on the screen
  - **Transparency**—Adjusts the transparency of the menu background.

Input Menu

The following input menu options are listed in the order they appear onscreen.

- **Display Port**—Selects the DisplayPort connector as the input.
- **VGA**—Selects the VGA connector as the input.
- **DVI/HDMI**—Selects the DVI/HDMI as the input.
- **autoscan**—Automatically selects the input device to use.

C

Safety Precautions

General Safety Precautions

Caution Before installing and operating the NI TSM-101x monitor, read these safety instructions carefully.

- Disconnect all power from the monitor when installing or moving the monitor.
- Do not apply voltage levels that exceed the specified voltage range.
- Do not drop or insert any objects into the ventilation openings of the monitor.
- If considerable amounts of dust, water, or fluids enter the monitor, turn off the power supply immediately, disconnect the power cord, and contact National Instruments.
- Do not strike or exert excessive force on the LCD panel.
- Do not drop or the monitor.
- Do not touch the LCD panel with a sharp object.

Anti-Static Precautions

Caution Failure to follow these precautions may result in permanent damage to the monitor and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components. Dry climates are especially susceptible to ESD. It is critical that whenever qualified personnel open the NI TSM-101x monitor and handle the electrical components, they adhere to the following anti-static precautions.

- Wear an anti-static wristband to help prevent ESD from damaging any electrical component.
- Before handling any electrical component, touch any grounded conducting material. Touch grounded conducting materials frequently while handling an electrical component.
- When configuring or working with an electrical component, place it on an anti-static pad.
- Handle electrical components by the edges only.

Maintenance and Cleaning

Caution Take the following precautions prior to cleaning any part or component of the monitor.

- Turn the monitor off before cleaning.
- Never spray or squirt liquids directly onto any components except the LCD panel. To clean the LCD panel, gently wipe it with a piece of soft dry cloth or a slightly moistened cloth.
- Keep fluids away from the monitor interior. The interior of the monitor does not require cleaning.

Cleaning Tools

Use the following tools to clean the monitor.

- Cloth
- Water or rubbing alcohol
- Vacuum cleaner
- Cotton swabs moistened with rubbing alcohol or water
- Foam swabs

D

NI Services

National Instruments provides global services and support as part of our commitment to your success. Take advantage of product services in addition to training and certification programs that meet your needs during each phase of the application life cycle; from planning and development through deployment and ongoing maintenance.

To get started, register your product at ni.com/myproducts.

As a registered NI product user, you are entitled to the following benefits:

- Access to applicable product services.
- Easier product management with an online account.
- Receive critical part notifications, software updates, and service expirations.

Log in to your National Instruments ni.com User Profile to get personalized access to your services.

Services and Resources

- **Maintenance and Hardware Services—**NI helps you identify your systems' accuracy and reliability requirements and provides warranty, sparing, and calibration services to help you maintain accuracy and minimize downtime over the life of your system. Visit ni.com/services for more information**.**
  - **Warranty and Repair—**All NI hardware features a one-year standard warranty that is extendable up to five years. NI offers repair services performed in a timely manner by highly trained factory technicians using only original parts at a National Instruments service center.
  - **Calibration—**Through regular calibration, you can quantify and improve the measurement performance of an instrument. NI provides state-of-the-art calibration services. If your product supports calibration, you can obtain the calibration certificate for your product at ni.com/calibration.
- **System Integration**—If you have time constraints, limited in-house technical resources, or other project challenges, National Instruments Alliance Partner members can help. To learn more, call your local NI office or visit ni.com/alliance.

- **Training and Certification**—The NI training and certification program is the most effective way to increase application development proficiency and productivity. Visit ni.com/training for more information.
  - The Skills Guide assists you in identifying the proficiency requirements of your current application and gives you options for obtaining those skills consistent with your time and budget constraints and personal learning preferences. Visit ni.com/skills-guide to see these custom paths.
  - NI offers courses in several languages and formats including instructor-led classes at facilities worldwide, courses on-site at your facility, and online courses to serve your individual needs.
- **Technical Support**—Support at ni.com/support includes the following resources:
  - **Self-Help Technical Resources**—Visit ni.com/support for software drivers and updates, a searchable KnowledgeBase, product manuals, step-by-step troubleshooting wizards, thousands of example programs, tutorials, application notes, instrument drivers, and so on. Registered users also receive access to the NI Discussion Forums at ni.com/forums. NI Applications Engineers make sure every question submitted online receives an answer.
  - **Software Support Service Membership**—The Standard Service Program (SSP) is a renewable one-year subscription included with almost every NI software product, including NI Developer Suite. This program entitles members to direct access to NI Applications Engineers through phone and email for one-to-one technical support, as well as exclusive access to online training modules at ni.com/self-paced-training. NI also offers flexible extended contract options that guarantee your SSP benefits are available without interruption for as long as you need them. Visit ni.com/ssp for more information.
- **Declaration of Conformity (DoC)**—A DoC is our claim of compliance with the Council of the European Communities using the manufacturer's declaration of conformity. This system affords the user protection for electromagnetic compatibility (EMC) and product safety. You can obtain the DoC for your product by visiting ni.com/certification.

For information about other technical support options in your area, visit ni.com/services, or contact your local office at ni.com/contact.

You also can visit the Worldwide Offices section of ni.com/niglobal to access the branch office websites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.